

ORNITHOLOGICAL LITERATURE

SPECIATION IN THE AVIAN GENUS JUNCO. By Alden H. Miller. University of California Publications in Zoölogy, 44, No. 3: 173-434, 33 text figures. May 24, 1941 [our copy received August 15]. \$3.00.

This study, based upon nearly twelve thousand museum specimens, is an analysis of the variations in size and color among populations of Juncos, in order to determine the degree of unity of each form and to trace the successive stages of differentiation from individual variants to the species. Although it is not primarily a taxonomic study, a revision of the genus was made in order that the subsequent conclusions might rest upon a sound base. Twenty-one forms of Juncos are recognized, of which no less than ten are considered full species. Under each form there are stated its characters, range, and in the appendices its synonymy and notes on the type specimen. No new forms are proposed, although Dwight's name *cismontanus* is applied to the Cassiar Junco on what appears to be rather weak nomenclatural grounds.

The variable characters of each form (size, intensity of pigmentation, and color pattern) are analyzed in minute detail, and in many cases the variations shown by different populations of the same form are compared. These are well illustrated by charts and graphs. A worthy and rather novel feature is the interpretation of the mode of inheritance of characters through the correspondence to Mendelian ratios of the numbers of individuals of various phenotypes found in samples of wild populations.

Intergradation, or "hybridization," between forms is studied. Spot maps of the critical areas helps to illustrate the situation. Twelve more or less distinct successive stages of segregation are recognized, ranging from complete differentiation to nearly complete inosculation. The ranges of all the Juncos are complementary, and intergradation or crossing invariably occurs wherever it is geographically possible. Thus of the fifteen forms of dark-eyed Juncos, which Miller places in five specific units, twelve are connected by intergrades or "hybrids" in a chain of races. Two others intergrade by individual variation, and the last form is an insular one. In the yellow-eyed group, four of the five members are considered full species. Intergradation occurs between only two forms. The other three occupy isolated mountains, so intergradation is physically impossible, but some of them at least are even less different than certain forms which are treated as races.

The distinction made between hybridization and intergradation and between species and race is not entirely clear, but it appears to have some historical connotations. For example, the *hyemalis* forms and the *oreganus* forms are considered separate species, although connected by an intergrading intermediate subspecies, because it is thought that their juncture has been secondary. If this distinction is made, is it logical to rank as subspecies the connecting forms of supposed hybrid origin, such as *J. hyemalis cismontanus* and *J. caniceps dorsalis*?

Junco caniceps caniceps is considered specifically distinct from *J. oregonus*, and the two are not even placed in the same "Artenkreis." Yet the intergradation between *caniceps* and its race *dorsalis* is said to be of the same type as, and is apparently no more frequent than, that between *caniceps* and *J. oregonus mearnsi* and between *caniceps* and *J. oregonus thurberi*.

Miller's species of Juncos are not of equal rank with most other avian species. Rather, they are divisions of a species, representing groups of races which have certain characters in common, in contrast to other groups of races with different common characters. The limits of our system of nomenclature are such that it is impossible to express every degree of relationship by a name of different rank, and it confuses rather than clarifies the case to attempt to express degrees of relationship by employing Rassenkreis terms when these are used with a much more restricted meaning than originally intended. As Miller himself says, most

of his "species" and "Artenkreise" would by many people be placed in a single Rassenkreis.

In the final portion of the paper the results of breeding experiments and the phylogenetic relationships of the various forms are discussed. The breeding experiments yielded only a single F_1 offspring raised to maturity. A back cross was made between this bird and one of the parental types. The author suggests that the failures in attempted laboratory matings were due to faulty technique rather than to lack of fertility between forms.

No matter at what place the Juncos may have evolved originally, the southernmost member, *J. vulcani*, is considered to represent the most primitive stage in the genus. The yellow-eyed Juncos arose in Tertiary times, and in turn gave rise to the dark-eyed Juncos. The next stage was the splitting of the dark-eyed birds into three branches—a pale-headed *insularis*-like bird on the west coast, a *caniceps*-like bird in the interior, and a *hyemalis*-like bird in the east. These branches were isolated until the glacial periods, during which time there was a secondary juncture. Contemporaneously, a new group of dark-headed birds invaded the west.

The characters of some forms are directly correlated with climatic conditions. In other cases, while not correlated to the present environment, they possibly were to the environment of the not-distant past. Certain forms evolved independently, and others are the product of hybridization of two independently derived stocks. Under the right conditions of isolation, individual variants give rise to races, and these in turn form species.

While primarily of interest to ornithologists, Miller's paper should be studied by all students of variation and evolution. It is a very careful analysis of a difficult and plastic group, and the principles discovered in force will undoubtedly be found to apply in other special fields.—P. Brodtkorb.

TERRITORIAL AND MATING BEHAVIOR OF THE HOUSE WREN. By Charles Kendeigh. Illinois Biological Monographs, 18, No. 3, 1941. 1-120, 32 figures. (University of Illinois Press, Urbana, Ill.). \$1.50.

This account of territorial and pairing behavior of *Troglodytes aedon* is based on a 19-year study in northeastern Ohio on the estate of the late Dr. S. Prentiss Baldwin; 331 matings of 142 males and 147 females are involved. The first 58 pages cover: spring arrival of birds; establishment and defense of territories; characteristics of the territory; reproductive vigor; mating behavior; and termination of nesting. Chapter 8 gives a "History of Individual Territories" with 51 pages in small print discussing 215 territories illustrated with 32 maps. Finally five pages are devoted to histories of 98 birds that were present two or more years.

All adults and young are banded with aluminum bands, the adults being also given red or yellow celluloid bands to indicate their sex. The House Wren, dependent as he is on nest boxes, is much less insistent on returning to his former territory than the European Wren is on staying on his, nor the Song Sparrow on either staying on or returning to his. The House Wren is the most aggressive of all the wrens in that it seeks to remove possible hole-nesting competitors by destroying eggs or young of its own or other species, even in some cases of birds building open nests. In the 331 nestings eggs were destroyed in 13 instances and young in 5, i.e., 6 per cent. Miss Sherman and others believe that the House Wren has become unduly abundant because of man's providing a vast supply of protected nest-sites. Dr. Kendeigh writes, "Destruction by wrens of nestlings of other wrens, bluebirds, and house sparrows is especially prevalent under conditions of high population or perhaps over-population," (p. 33). In many places the House Wren is displacing the Bewick Wren. "The northward dispersal of this species appears to be hindered by the house wren, which in turn is probably limited in its southward distribution by the Bewick Wren." So far as I know *Thryomanes bewicki* does not destroy nests or young of any species.